
HP 3326A INSTALLATION MANUAL

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HP 3326A INSTALLATION MANUAL

This Installation manual contains instructions for installing and interfacing the HP 3326A Synthesizer. Included are initial inspection procedures, power and grounding requirements, operating environment, available accessories and options, installation instructions, HP-IB interfacing procedures, and instructions for repacking and shipping.

INITIAL INSPECTION

The HP 3326A was carefully inspected both mechanically and electrically before shipment. It should be free of marks or scratches and in perfect electrical order upon receipt. To confirm this, inspect the HP 3326A for physical damage incurred in transit. If the HP 3326A was damaged in transit, file a claim with the carrier. Check for supplied accessories (listed in this chapter) and test the electrical performance using the Operational Verification tests in the Service Manual. If there is damage or deficiency, see the warranty in the front of the Operating and Reference Manual.

WARNING

The integrity of the protective earth ground may be interrupted if the HP 3326A is mechanically damaged. Under no circumstances should the HP 3326A be connected to power if it is damaged.

POWER REQUIREMENTS

CAUTION

Before applying ac line power to the HP 3326A, ensure the voltage selector on the HP 3326A rear panel is set for the proper line voltage and the correct line fuse is installed in the fuse holder. Procedures for changing the line voltage selector and fuse are contained in the following section for "Line Voltage Selection."

The HP 3326A can operate from any single phase ac power source supplying 100 V, 120 V, 220 V or 240 V (– 10% to + 5%) in the frequency range from 48 to 66 Hz (see Figure 1). With all options installed, power consumption is less than 200 VA when on, and less than 15 VA in standby.

LINE VOLTAGE SELECTION

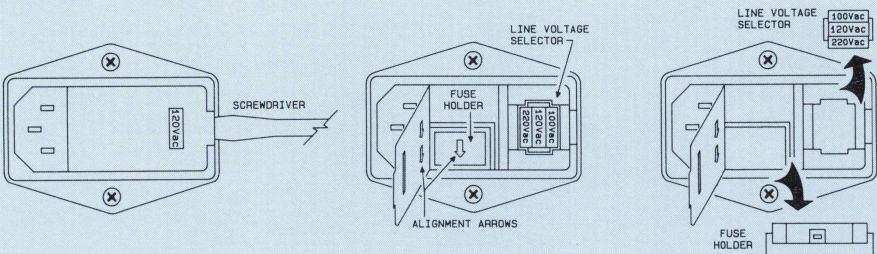
The line voltage selector is set at the factory to correspond to the most commonly used line voltage of the country of destination. The line voltage selected for the HP 3326A

is indicated on the line voltage selector. Refer to Figure 1 for the line voltage ranges and Figure 2 for setting the line voltage and selecting the appropriate fuse. To change the line voltage and fuse:

- Remove the power cord.
- Pry open the power selector cover with a small screwdriver.
- To check or replace the fuse, pull the white fuse holder out of the power selector and remove the fuse from the fuse holder.
- To reinstall the fuse, insert a fuse with the proper rating into the fuse holder. Align the white arrow on the top of the fuse holder with the two white arrows on the power selector cover. All three white arrows should point in the same direction. Push the fuse holder into the power selector.
- To change the line voltage, remove the cylindrical line voltage selector.
- Reinstall the cylindrical line voltage selector and ensure the required voltage label is facing out of the power selector.
- Close the power selector by pushing firmly on the black cover.
- Check that the correct line voltage appears through the window in the power selector cover.

| Selector Voltage | Voltage Range |
|------------------|---------------|
| 100 | 90-105V |
| 120 | 108-126V |
| 220 | 198-231V |
| 240 | 216-252V |

Figure 1. Line Voltage Ranges



CAUTION

Remove line voltage selector to change voltage. Rotating selector without removing will damage the module.

| Line Setting | Fuse Type | HP Part Number |
|--------------|-------------------------|----------------|
| 110 V/120 V | 3 A 250 V NORMAL BLOW | 2110-0003 |
| 220 V/240 V | 1.5 A 250 V NORMAL BLOW | 2110-0043 |

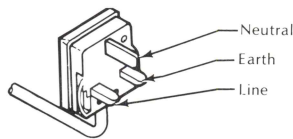
Figure 2. Line Voltage and Fuse Selection

POWER CABLE AND GROUNDING REQUIREMENTS

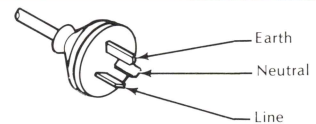
The HP 3326A is equipped with a three-conductor power cord which, when plugged into an appropriate receptacle, grounds the HP 3326A cabinet. The type of power cable plug shipped with each instrument depends on the country of destination. Refer to Figure 3 for the part number of the power cable and plug configurations available.

WARNING

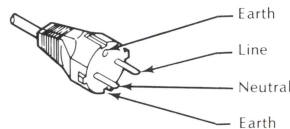
The power cable plug must be inserted into a socket outlet provided with a protective earth terminal. Defeating the protection of the grounded instrument cabinet can subject the operator to lethal voltages.



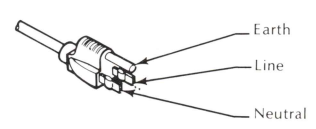
PLUG*: BS 1363A
CABLE*: HP 8120-1703
250 V
OPERATION



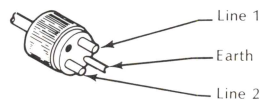
PLUG*: NZSS 198/AS C112
CABLE*: HP 8120-0696
250 V
OPERATION



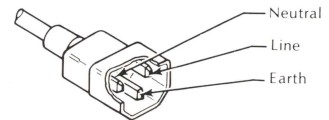
PLUG*: CEE7-V11
CABLE*: HP 8120-1692
250 V
OPERATION



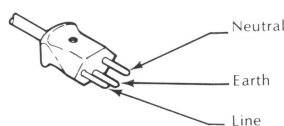
PLUG*: NEMA 5-15P
CABLE*: HP 8120-1521
125 V-6A**



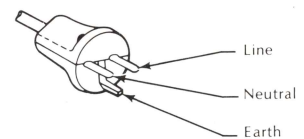
PLUG*: NEMA 5-15P
CABLE*: HP 8120-0698
250 V - 6A**



PLUG*: CEE7-V11
CABLE*: HP 8120-1692
250 V
OPERATION



PLUG*: SEV 1011.1959-24507
TYPE 12
CABLE*: HP 8120-2104
250 V
OPERATION



PLUG*: DHCR 107
CABLE*: HP 8120-2956
250 V
OPERATION

Figure 3. Power Cables

OPTIONS

Figure 4 lists the options available for the HP 3326A. These options are available when the instrument is ordered by specifying the option number, or are available for later installation by ordering the option part number.

| HP 3326A Option | HP Part Number | Description |
|-----------------|----------------|--|
| 001 | 03326-91001 | High Stability Frequency Reference |
| 002 | 03326-91002 | High Voltage Output |
| 003 | 03326-91003 | Rear Panel Outputs |
| 907 | 5061-0090 | Front Handle Kit |
| 908 | 5061-0078 | Rack Flange Kit |
| 909 | 5061-0084 | Rack Mount Flange Kit with Handles |
| 910 | 03326-90000 | Extra Operating Manual |

Figure 4. Options

ACCESSORIES SUPPLIED

Figure 5 lists the accessories supplied with the HP 3326A. Additional Operating and Service manuals may be ordered through your HP Sales and Service Office.

NOTE

The Service Manual is not included with the HP 3326A if Option 914 is requested. Option 914 is a delete option for the service manual.

| Description | Quantity | HP Part Number |
|------------------|----------|----------------|
| Operating Manual | 1 ea. | 03326-90000 |
| Service Manual | 1 ea. | 03326-90010 |

Figure 5. Accessories Supplied

ACCESSORIES AVAILABLE

Figure 6 lists the accessories available for the HP 3326A. These accessories may be obtained through your HP Sales and Service Office.

| Accessory | HP Part Number |
|-----------------------|----------------|
| Ground Isolator | 15507A |
| Power Splitter | 11652-60009 |
| 50 Ω Feed | |
| Thru Termination | 11048C |
| Transit Case | 9211-2656 |
| Service Accessory Kit | 03376-84401 |

Figure 6. Accessories Available

OPERATING ENVIRONMENT

Figure 7 summarizes the HP 3326A operating environment ranges. In order for the HP 3326A to meet specifications, the operating environment must be within these limits.

WARNING

The HP 3326A is not designed for outdoor use. To prevent potential fire or shock hazard, do not expose the HP 3326A to rain or other excessive moisture.

Temperature

The HP 3326A may be operated in temperatures from 0° C to 55° C.

Humidity

The HP 3326A may be operated in environments with humidity up to 95% (0° C to +40° C). However, the HP 3326A should be protected from temperatures or temperature changes which cause condensation within the instrument.

Altitude

The HP 3326A may be operated at altitudes up to 4572 meters (15,000 feet).

Figure 7. Operating Environment

INSTRUMENT COOLING

The HP 3326A is equipped with a cooling fan mounted on the rear panel. The HP 3326A should be mounted so that air can freely circulate through it. When operating the HP 3326A, choose a location that provides at least 75 mm (3 inches) of clearance at the rear, and at least 25 mm (1 inch) of clearance at each side. Failure to provide adequate air clearance will result in excessive internal temperature, reducing instrument reliability. The filter for the cooling fan can be removed for cleaning. The filter is removed by disconnecting the power cord and removing the four knurled nuts (HP part number 0535-0013). The filter (HP part number 3150-0218) should be removed and cleaned by flushing with soapy water every thirty days.

The HP 3326A is also equipped with a thermal cutout switch which automatically puts the HP 3326A in standby whenever the internal temperature is excessive. The temperature at which this occurs is dependent upon line voltage and airflow. With proper airflow and operating line voltage, thermal cutout will not occur at less than a 65° C ambient temperature. The switch resets automatically when the HP 3326A cools. If a thermal cutout occurs, disconnect the power cord and check for fan stoppage, clogged fan ports, clogged filter, or other conditions that can obstruct airflow or otherwise cause excessive heating.

NOTE

The thermal cutout may operate at external temperatures below 65° C if the airflow is blocked or line voltage is near the upper voltage limits.

INSTALLATION

The HP 3326A is shipped with plastic feet in place, ready for use as a portable bench instrument. The plastic feet are shaped to make full width modular instruments self align when they are stacked. The clearances provided by the plastic feet in bench stacking and the filler strip in rack mounting allow air passage across the top and bottom cabinet surfaces.

A front handle kit can be installed for ease of handling the HP 3326A on the bench. The part number for the front handle kit is listed in Figure 6.

Option 908 (Rack Mount Flange Kit) and 909 (Rack Mount Flange Kit with Handles) enable the HP 3326A to be mounted in an equipment cabinet. The rack mount for the HP 3326A is EIA standard width of 482.6 mm (19 inches). To install the HP 3326A in an equipment cabinet:

- If installed, remove the plastic trim (Figure 8) and front handles from the HP 3326A.
- Remove the plastic feet from the bottom of the HP 3326A.
- Install the rack flange kit with or without handles according to instructions included with the kit. (Kit part numbers are listed in Figure 6.)

NOTE

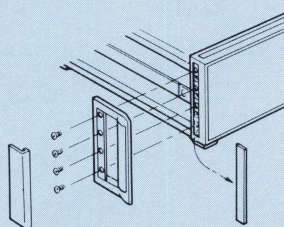
The rack mount flange kit of Option 908 will not provide the space requirement for rack mounting when used with the front handle kit of Option 907. If front handles are not available, use the combination kit of Option 909 to rack mount with handles. If Option 907 front handles are available, use Rack Mount Flange Kit, HP part number 5061-2072 to add rack mounting.

- Install an instrument support rail on each side of the instrument cabinet. (The instrument support rails, used to support the weight of the instrument, are included with HP instrument cabinets.)

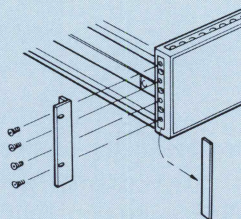
WARNING

The HP 3326A is heavy (approximately 27 kg, 60 lbs.). Use extreme care when lifting it to avoid personal injury. The weight of the HP 3326A must be supported by instrument support rails inside the instrument cabinet. Do not, under any circumstances, attempt to rack mount the HP 3326A using only the front flanges.

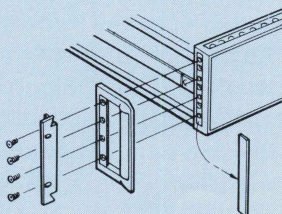
- Using two people, lift the HP 3326A to its position in the cabinet on top of the instrument support rails.
- Using the appropriate screws, fasten the HP 3326A rack mount flanges to the front of the instrument cabinet.

**HANDLE KIT, BENCH OPERATION**

5061-0090
OPTION 907

**RACK MOUNT FLANGE KIT**

5061-0078
OPTION 908

**RACK MOUNT FLANGE/FRONT HANDLE KIT**

5061-0084
OPTION 909

Figure 8. Rack Mount and Handle Kits

HP-IB SYSTEM INTERFACE CONNECTIONS

The HP 3326A instrument is compatible with the Hewlett-Packard Interface Bus (HP-IB). The HP-IB is Hewlett-Packard's implementation of IEEE Standard 488-1978 and ANSI Standard MC 1.1. The HP 3326A is connected to the HP-IB by connecting an HP-IB interface cable to the connector located on the rear panel. Figure 9 illustrates a typical HP-IB system interconnection.

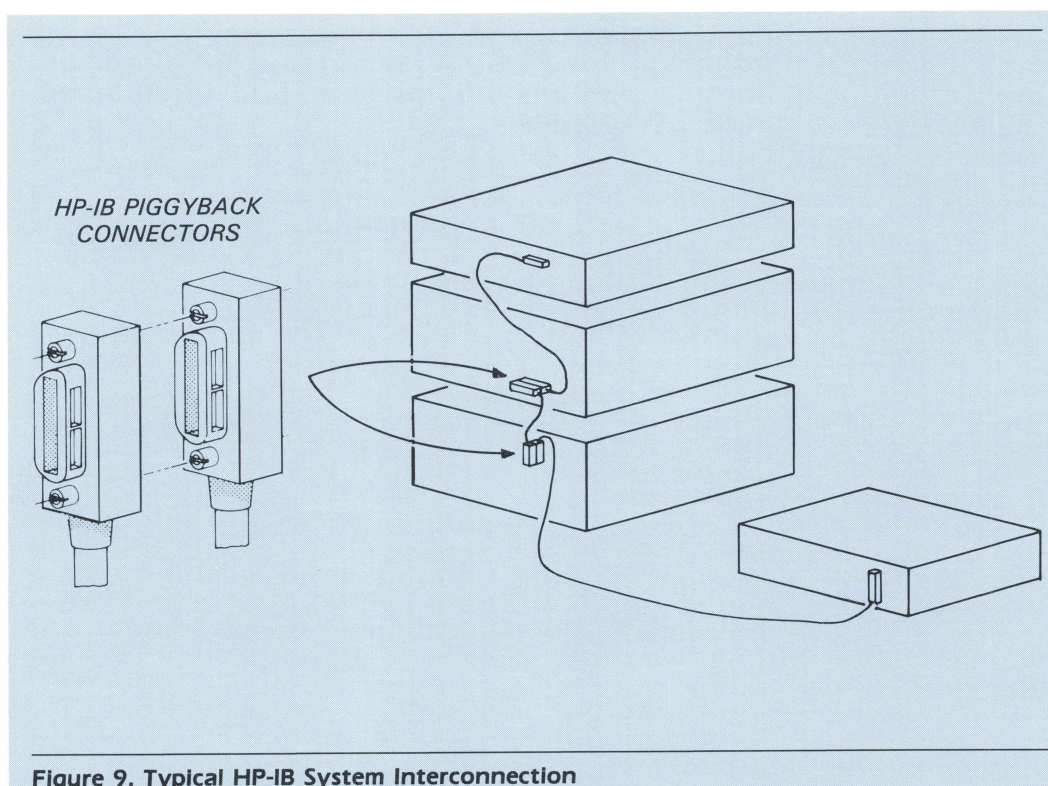
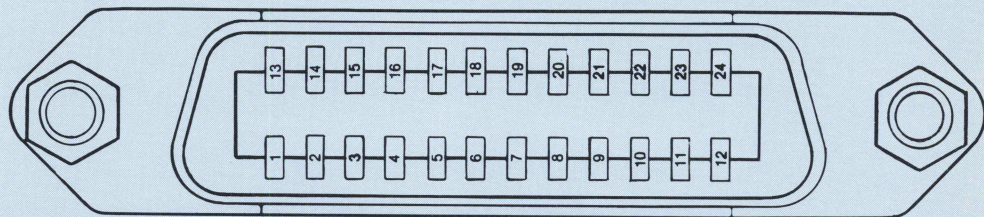


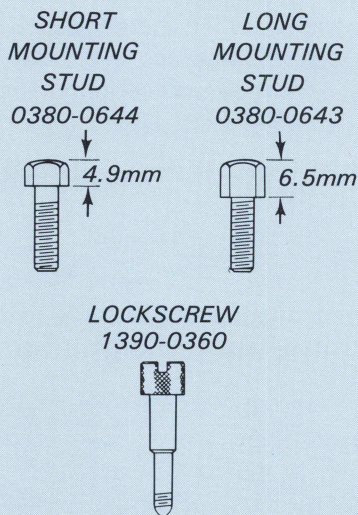
Figure 9. Typical HP-IB System Interconnection

With the HP-IB system, up to 15 HP-IB compatible instruments can be interconnected. The HP 10833 HP-IB cables have identical piggy-back connectors on each end so that several cables can be connected to a single source without special adapters or switch boxes. System components and devices can be connected in virtually any configuration. There must, of course, be a path from the controller to every device operating on the bus. As a practical matter, avoid stacking more than three or four cables on any one connector. If the stack gets too long, any force on the stack can damage the connector mounting. Be sure that each connector is firmly screwed in place to keep it from working loose during use (see CAUTION in Figure 10). The HP 3326A uses all the available HP-IB lines, therefore, any damaged connector pins may adversely affect HP-IB operation. Refer to Figure 10 for a description of the HP-IB connector.



CAUTION

The HP 3326A contains metric threaded HP-IB cable mounting studs as opposed to English threads. Metric threaded HP 10833A, B, C or D HP-IB cable lockscrews must be used to secure the cable to the instrument. Identification of the two types of mounting studs and lockscrews is made by their color. English threaded fasteners are colored silver and metric threaded fasteners are colored black. DO NOT mate silver and black fasteners to each other or the threads of either or both will be destroyed. Metric threaded HP-IB cable hardware illustrations and part numbers follow.



| PIN | LINE |
|-----|------------------------------|
| 1 | D101 |
| 2 | D102 |
| 3 | D103 |
| 4 | D104 |
| 13 | D105 |
| 14 | D106 |
| 15 | D107 |
| 16 | D108 |
| 5 | DO1 |
| 17 | REN |
| 6 | DAV |
| 7 | NRFD |
| 8 | NDAC |
| 9 | IFC |
| 10 | SRQ |
| 11 | ATN |
| 12 | SHIELD - CHASSIS GROUND |
| 18 | P/O TWISTED PAIR WITH PIN 6 |
| 19 | P/O TWISTED PAIR WITH PIN 7 |
| 20 | P/O TWISTED PAIR WITH PIN 8 |
| 21 | P/O TWISTED PAIR WITH PIN 9 |
| 22 | P/O TWISTED PAIR WITH PIN 10 |
| 23 | P/O TWISTED PAIR WITH PIN 11 |
| 24 | ISOLATED DIGITAL GROUND |

| HP-IB Interconnect Cables | |
|---------------------------|----------------|
| Part Number | Length |
| 10833A | 1 m (3.3 ft) |
| 10833B | 2 m (6.6 ft) |
| 10833C | 4 m 13.2 ft) |
| 10833D | 0.5 m (1.6 ft) |

Figure 10. Interfacing the HP-IB

To achieve design performance with the HP-IB, proper voltage levels and timing relationships must be maintained. If the system cable is too long, the lines cannot be driven properly and the system will fail to perform (see Figure 10 for HP-IB cable lengths). Therefore, when interconnecting an HP-IB system, it is important to observe the following rule:

Total cable length for the system must be less than or equal to 20 meters (65 feet) or 2 meters (6 feet) times the total number of devices connected to the bus, whichever is less.

HP-IB ADDRESS

The HP 3326A has a factory selected address of 18. The HP-IB address of the HP 3326A is stored in a nonvolatile memory (there are no address switches). Every device on the HP-IB must have a unique address. The HP 3326A address can be set at any address between 0 and 30, inclusive. When selecting an address, remember that the controller also has an address (usually 21). To view or change the HP-IB address:

- Press the blue SHIFT key followed by the LOCAL key in the HP-IB STATUS block to display the HP-IB address.
- Enter the address with the numeric keypad. For two digit HP-IB addresses, the address is set when the second digit is entered. For one digit HP-IB address, the address is set when any units key is pressed. Alternately, a zero can precede the single digit to form a two digit address.
- The message "Error 20 RNGE" is displayed if the HP-IB address exceeds 30.

STORAGE AND SHIPMENT

The HP 3326A should be stored in a clean, dry environment. The following are environmental limitations that apply to both storage and shipment:

| | | |
|-------------|-------|--------------------------------------|
| Temperature | | – 40° C to + 75°C |
| Humidity | | Up to 95% |
| Altitude | | Up to 15,300 meters (50,000 feet) |

The HP 3326A should also be protected from temperatures or temperature changes which cause condensation within the instrument.

Containers and materials identical to those used in factory packaging are available through Hewlett-Packard offices. If the instrument is being returned to Hewlett-Packard for service, attach a tag indicating the type of service required, return address, model number, and full serial number. Also, mark the container FRAGILE to ensure careful handling. In any correspondence, refer to the instrument by model number and full serial number.

The following general instructions should be used for repacking with commercially available materials:

- Wrap the instrument in heavy paper or anti-static plastic. If shipping to a Hewlett-Packard office or service center, attach a tag to the instrument indicating type of service required, return address, model number, and full serial number.
- Use a strong shipping container. A double-wall carton made of 350-pound test material is adequate.
- Use a layer of shock absorbing material 70 to 100 mm (3 to 4 inch) thick around all sides of the HP 3326A to provide firm cushioning and prevent movement inside of the container. Protect the control panel with cardboard.

| |
|----------------|
| CAUTION |
|----------------|

Styrene pellets in any shape should not be used as packing material. The pellets do not adequately cushion the instrument and do not prevent the instrument from shifting in the carton. The pellets also create static electricity which can damage electronic components.

- Seal shipping container securely.
- Mark shipping container FRAGILE to ensure careful handling.
- In any correspondence, refer to the instrument by model number and full serial number.



